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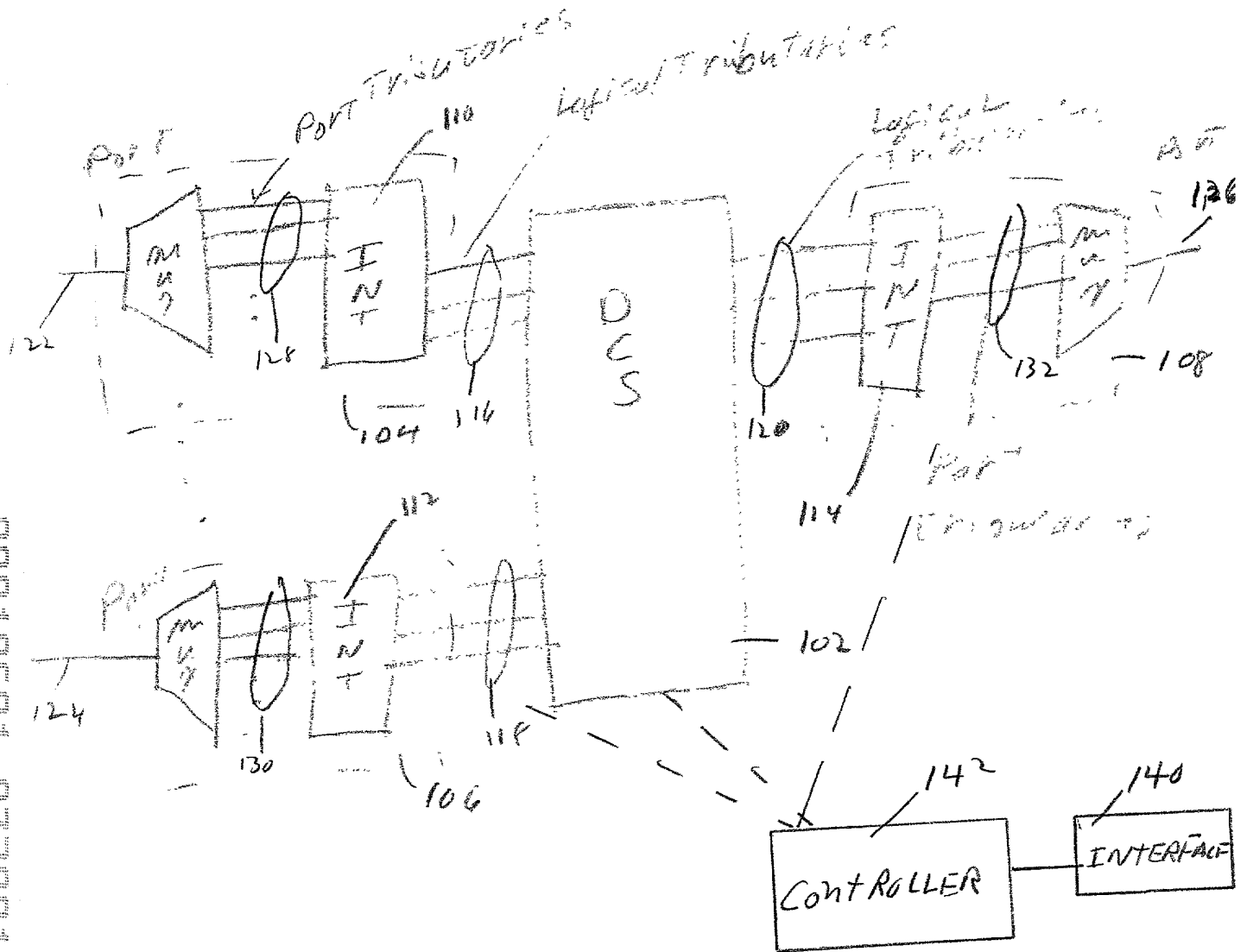
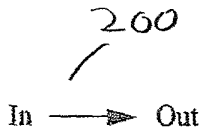


FIGURE 1



### Point-to-Point

consists of:

one leg (In-Out)

reported leg or leg-pair:

1way  
2way

## Atomic Cross-Connection Topologies



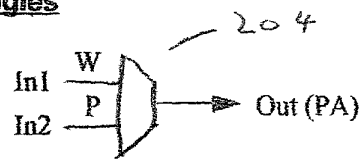
### Path-Protected

consists of:

path protection group  
working leg (In1-Out)  
protection leg (In2-Out)

reported leg or leg-pair:

1wayPS,W  
1wayPS,P



### Adjunct Path-Protected

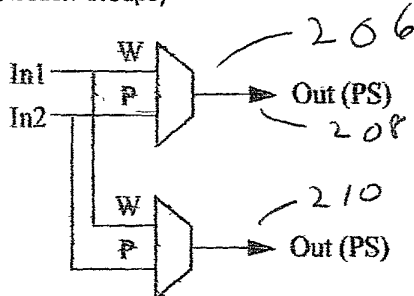
consists of:

adjunct working leg (In1-Out)  
adjunct protection leg (In2-Out)

reported leg or leg-pair:

1wayPA,W  
1wayPA,P

### Example with Bridged Path-Protected Cross-Connections (Separate Path Protection Groups)



### Example with Path-Protected and Adjunct Path-Protected Cross-Connections (Common Path Protection Group)

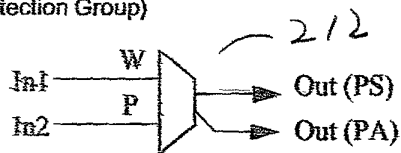
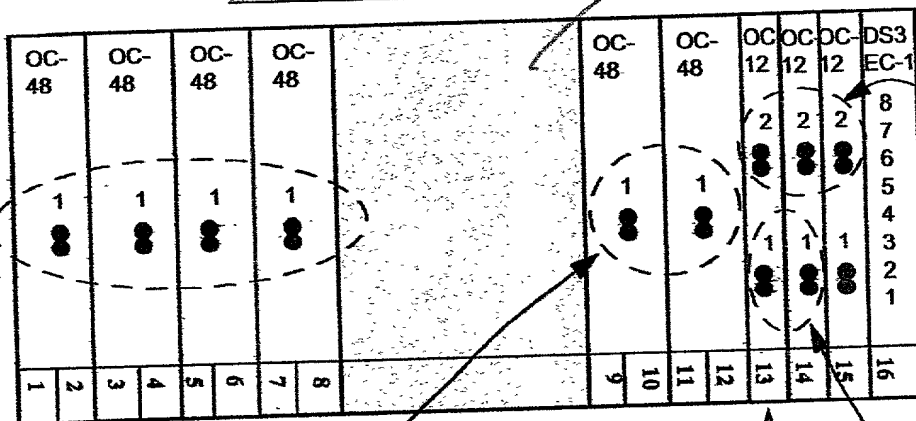


FIGURE 2

# Network Element / Equipment View

Bay 2  
Shelf 1



Ports (Lines) in 2-Fiber  
BLSR Group 2-1-T01  
2-1-T01-W-10-1  
2-1-T01-E-12-1

Ports in Slot 13  
2-1-O01-W-13-1  
2-1-N01-P-13-2

## Network Configuration / Services View

Ports (Lines) in 4-Fiber  
BLSR Group 2-1-F01  
2-1-F01-EP-08-1  
2-1-F01-EW-06-1  
2-1-F01-WW-04-1  
2-1-F01-WP-02-1

Ports (Lines) in 1xN  
Group 2-1-N01  
2-1-N01-P-13-2  
2-1-N01-1-14-2  
2-1-N01-2-15-2

Electrical Ports  
2-1-U-#16-1  
through  
2-1-U-#16-8

Unprotected (0x1)  
Port (Line)  
2-1-U-#15-1

Ports (Lines) in 1+1  
Group 2-1-O01  
2-1-O01-W-13-1  
2-1-O01-P-14-1

FIGURE 3A

FIGURE 3B

FIGURE 3C

# FIGURE 4

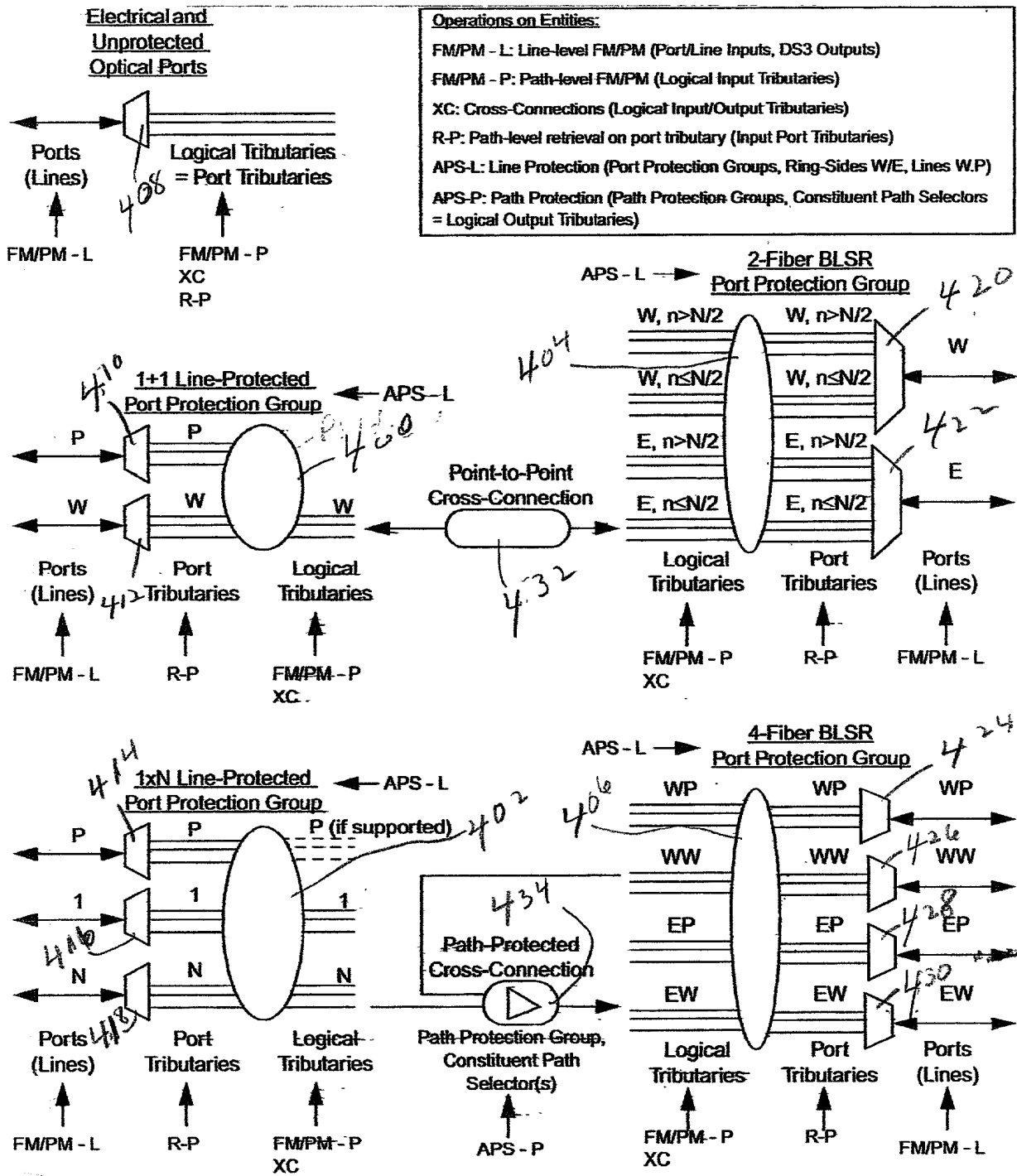
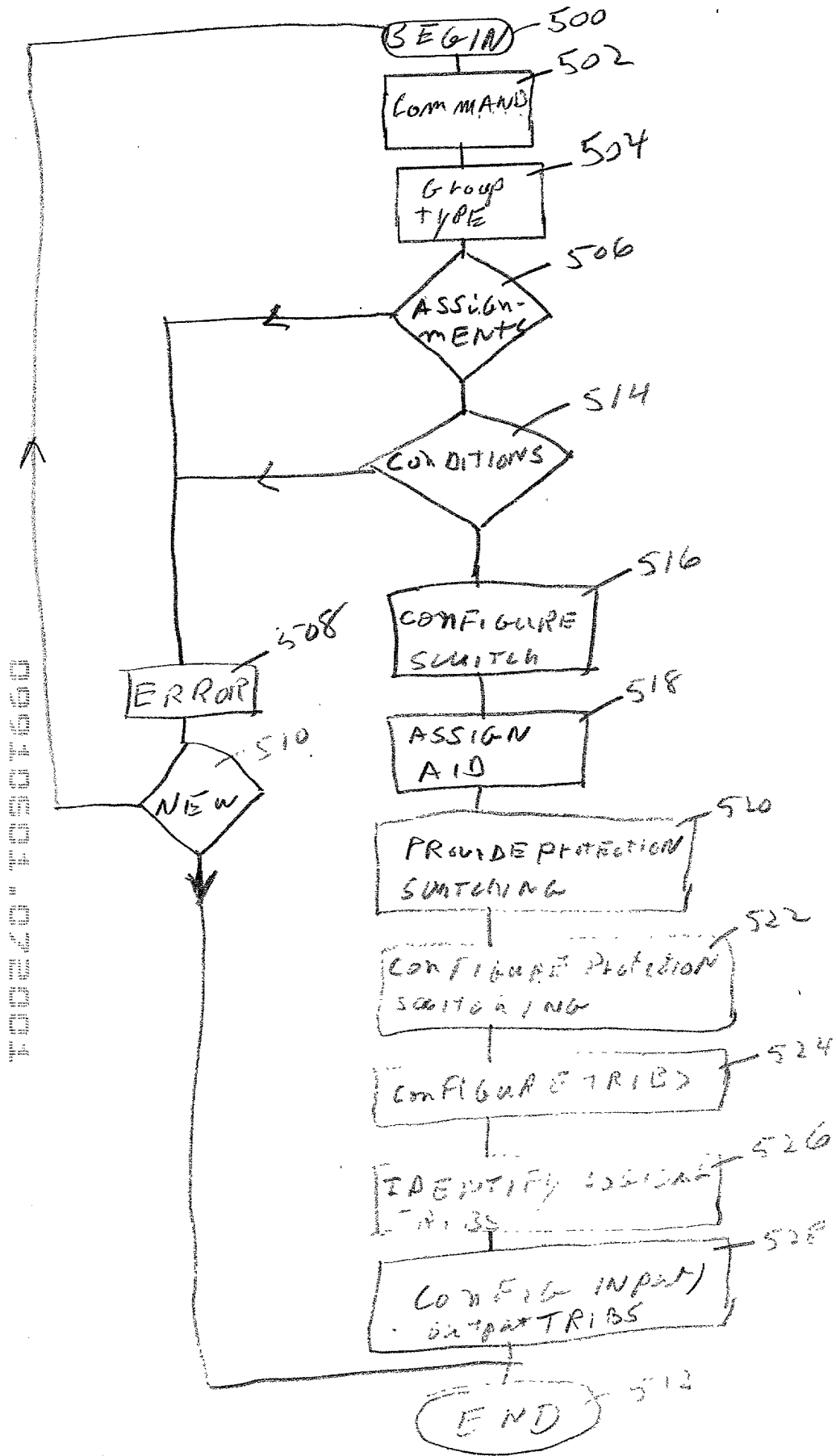


FIGURE 5



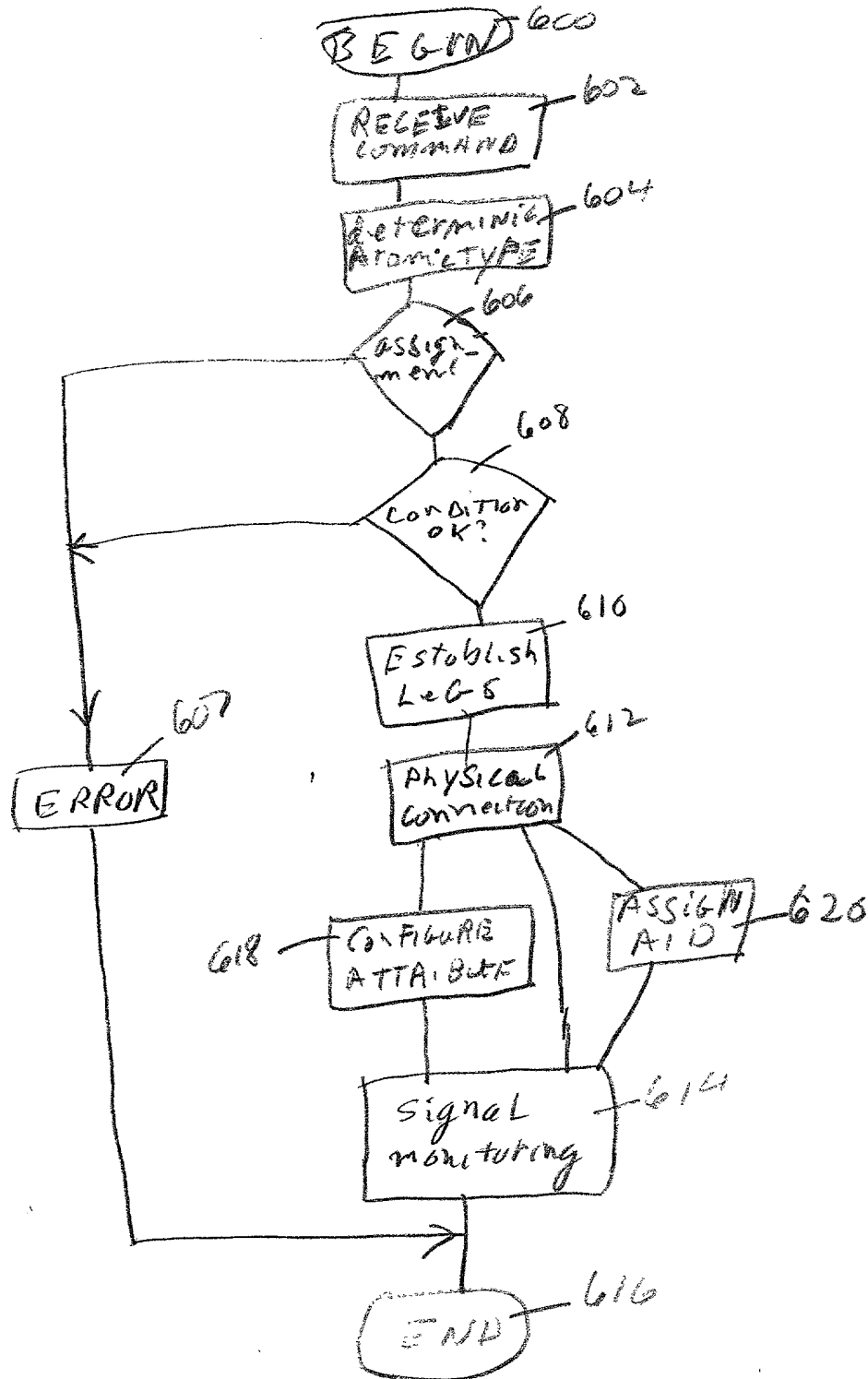


FIGURE 6

# FIGURE 7

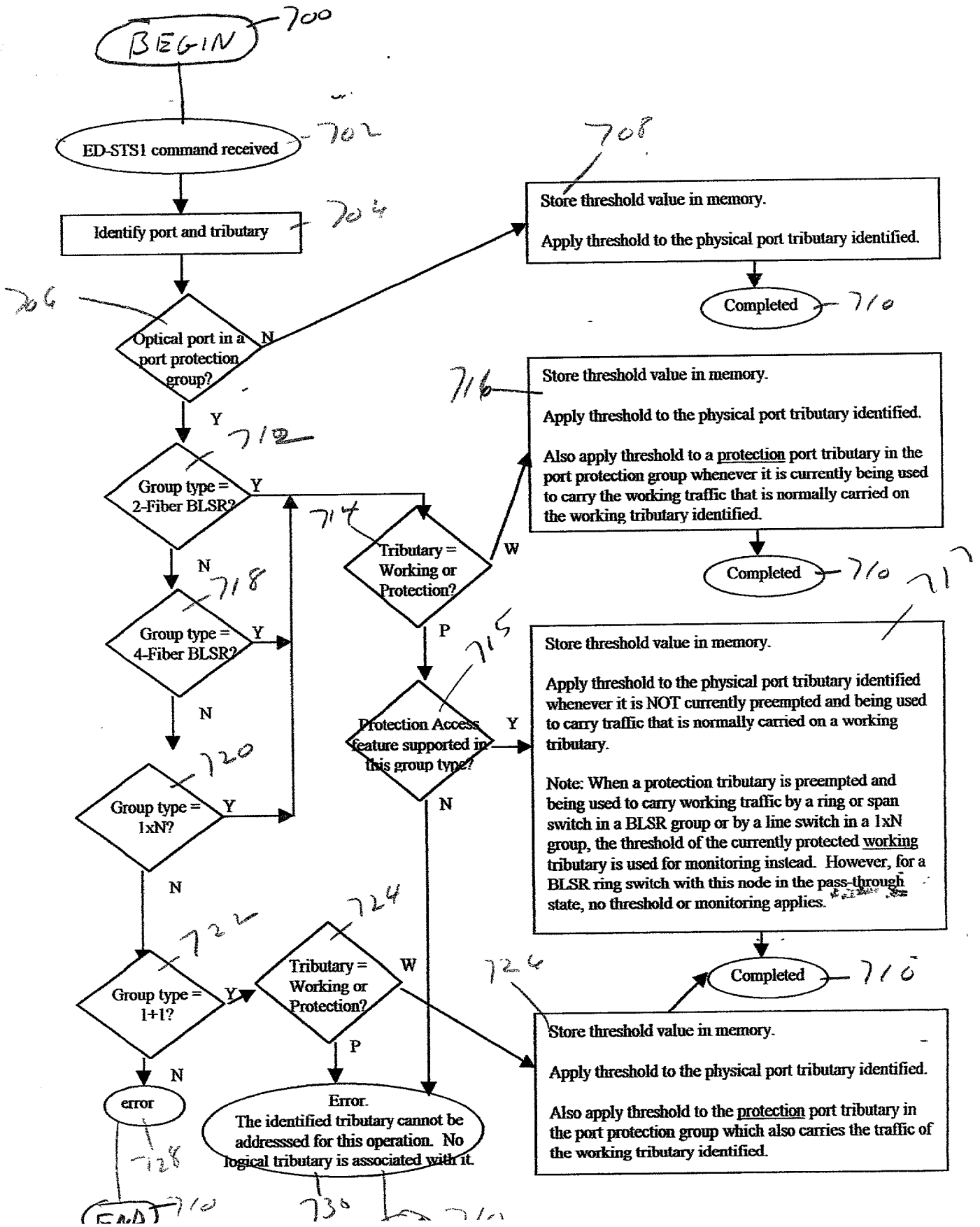
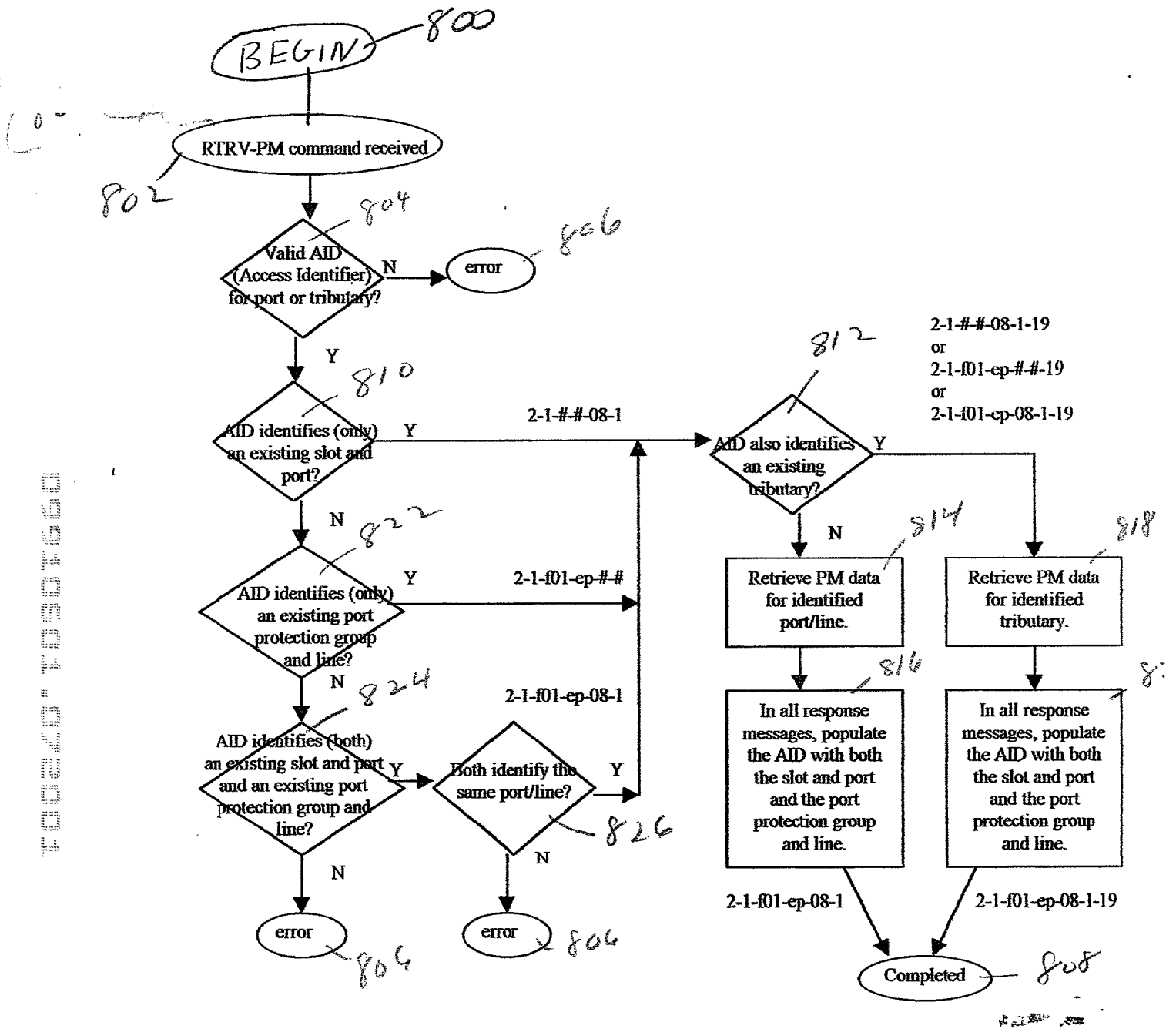
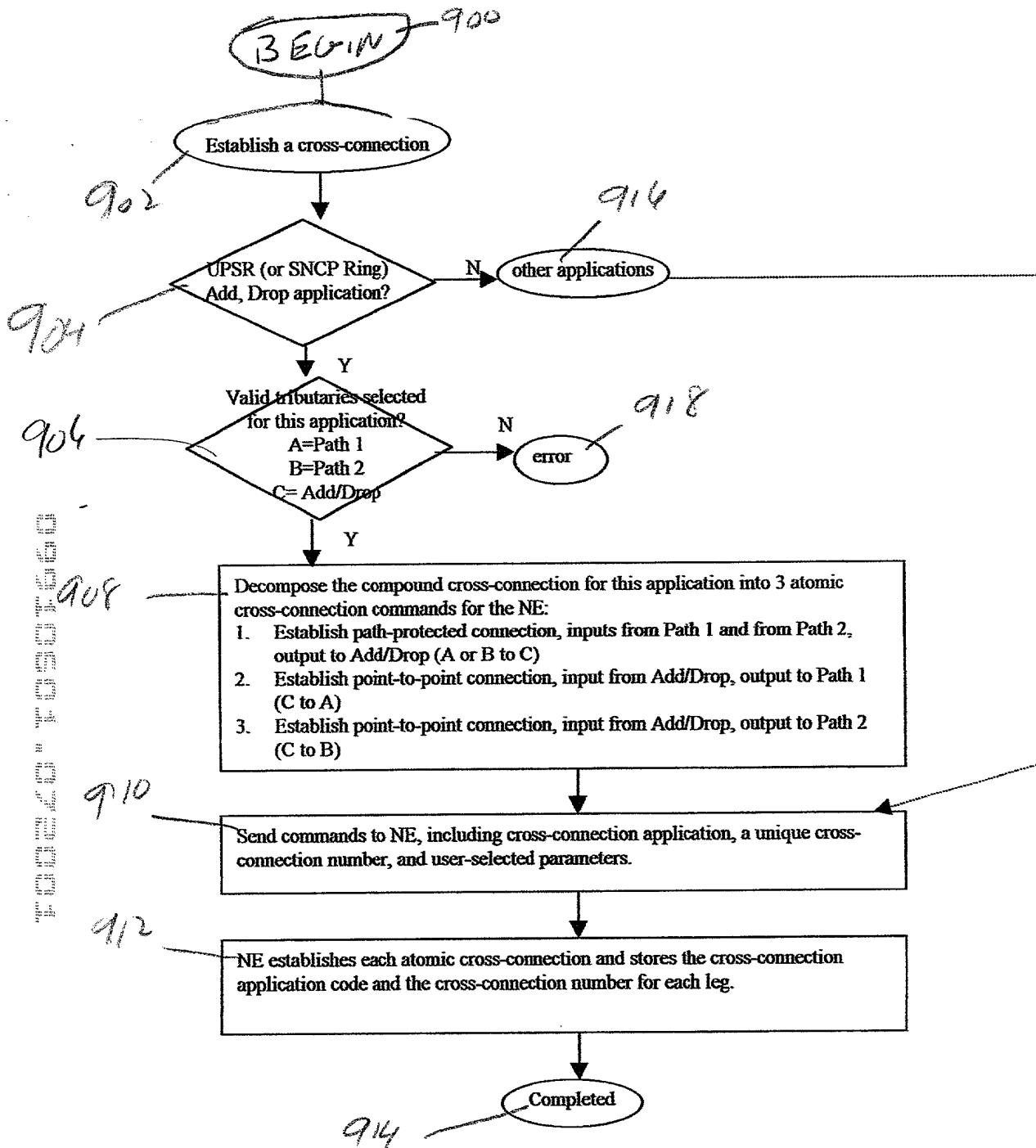


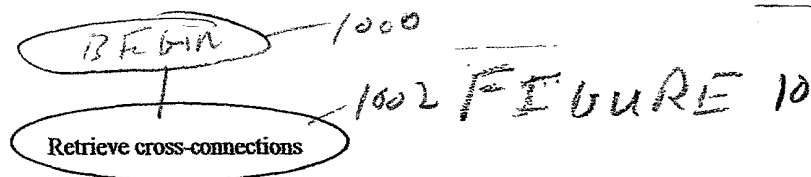
FIGURE 8





# FIGURE 9





Retrieve cross-connection information from the NE or a database. The NE provides the information separately for each cross-connection leg between a pair of logical tributaries. There are 6 types of legs, based on the atomic topologies:

- 2-way point-to-point leg-pair
- 1-way point-to-point leg
- 1-way path-protected, working leg
- 1-way path-protected, protection leg
- 1-way adjunct path-protected, working leg
- 1-way adjunct path-protected, protection leg

Associate any cross-connection legs having the same cross-connection number.

Do all legs with a particular cross-connection number have the same cross-connection application code and cross-connection rate?

N (or legs with no number)

UPSR (or SNCP Ring)  
Add, Drop application?

N other applications

Try to match the legs with the template for connections in this application:

- 1-way path-protected, working leg: from Path 1 to Add/Drop
- 1-way path-protected, protection leg: from Path 2 to Add/Drop
- 1-way point-to-point leg: from Add/Drop to Path 1
- 1-way point-to-point leg: from Add/Drop to Path 2

Expected number of legs of each type?  
Expected number of different tributaries?  
Expected use of each tributary  
for input and/or output?

Y  
(complete match)

Display connections as a single, compound cross-connection for the given application, using the template.

Display connections as individual legs, each between a pair of tributaries.

Repeat for each set of cross-connection legs (different cross-connection number)

More

No more

Completed

FIGURE 10

FIGURE 11

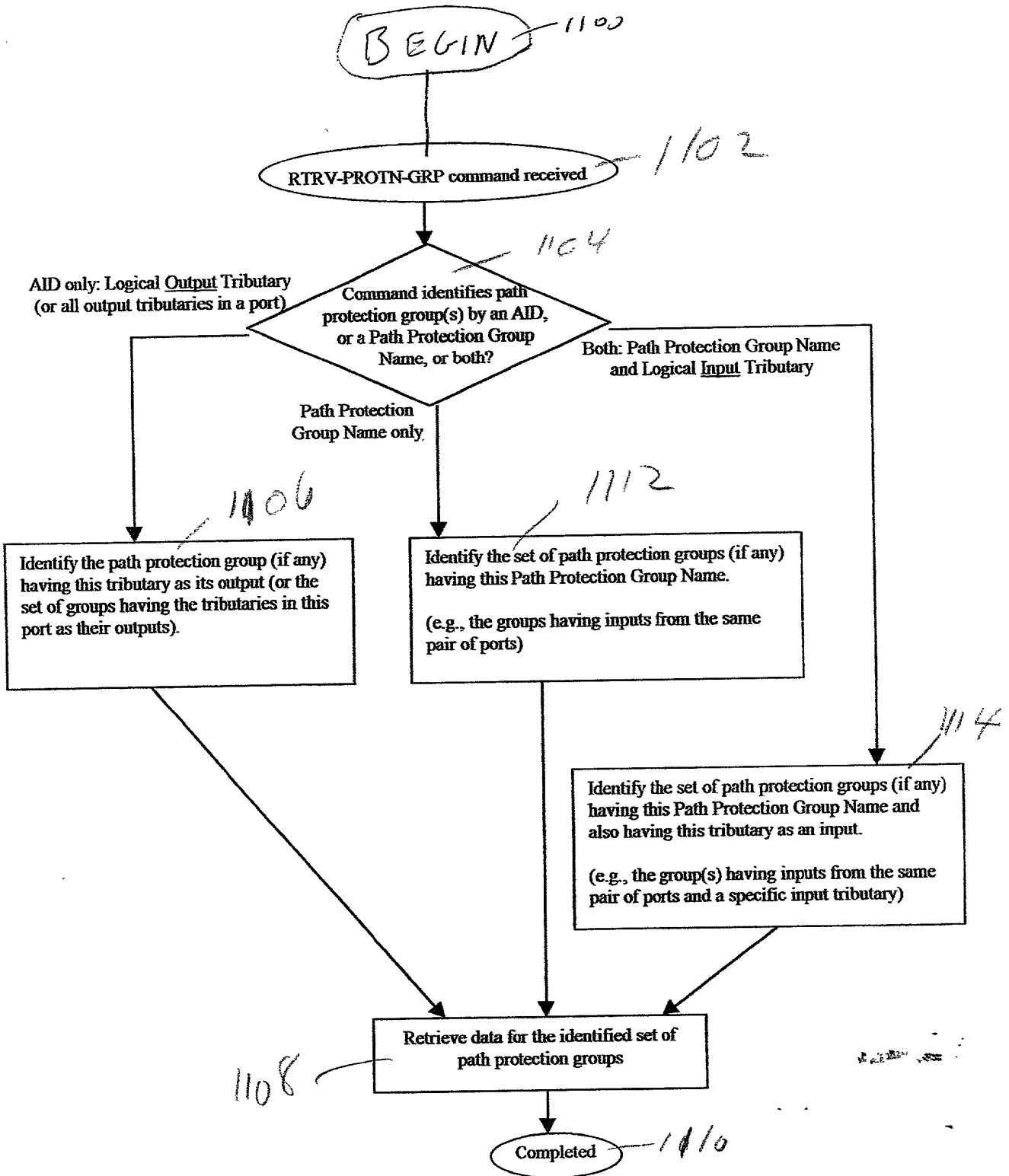


FIGURE 12

**1. XC Application = UPSR (or SNCP-Ring) Add, Drop**

**2. Expected Leg-Pairs**

- A', C', 2wayPS, W
  - B', C', 2wayPS, P
- OR
- A', C', 2wayPS, P
  - B', C', 2wayPS, W

**3. Match Tributary AIDs (A', B', C') to the Tributary Labels in this application:**

- A = "Path 1"
- B = "Path 2"
- C = "Add/Drop"

**4. Display fields:**

- XC Rate
- XC Application
- AID "Path 1"
- AID "Path 2"
- AID "Add/Drop"
- Indicate the Working input ("Path 1" or "Path 2")
- Other XC parameters

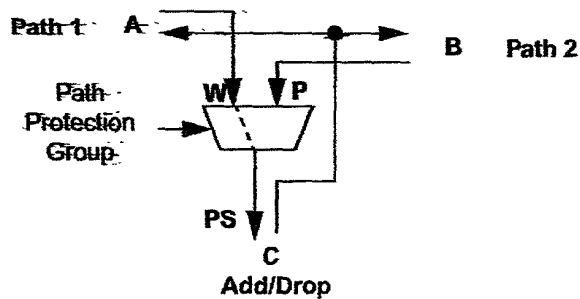


FIGURE 13

1. Establish Cross-Connection: Select application from list (includes atomic xc's)  
**Example: UPSR (or SNCP Ring) Add, Drop**
2. Select XC Rate
3. Select Tributary AIDs, for the Tributary Labels in this application:
  - A = "Path 1"
  - B = "Path 2" (default is corresponding trib in opposite line)
  - C = "Add/Drop"
4. Select Working input (A or B, default is A)
5. Add other info as needed, including XC Number
6. Send 3 commands to NE:
  - a. Establish path-protected xc, inputs from Path 1 and from Path 2, output to Add/Drop (A or B to C)
  - b. Establish point-to-point xc, input from Add/Drop, output to Path 1 (C to A)
  - c. Establish point-to-point xc, input from Add/Drop, output to Path 2 (C to B)

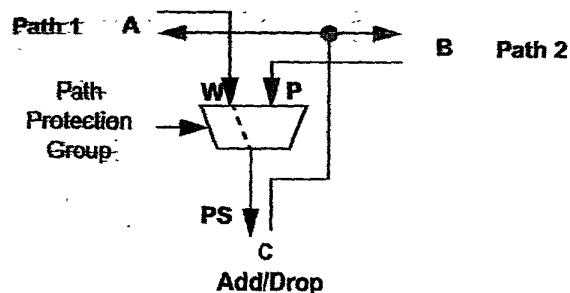


FIGURE 14

The examples in the next several figures show how Path Protection Group Names can be assigned to each set of path protection groups which the user may want to operate together, and separately from other sets. Where the figures show only a single group with a particular connectivity between ports and a unique label (e.g., "c"), this actually represents a set of path protection groups: one group for each of the STS-N/VC-N circuits using the tributaries of these ports.

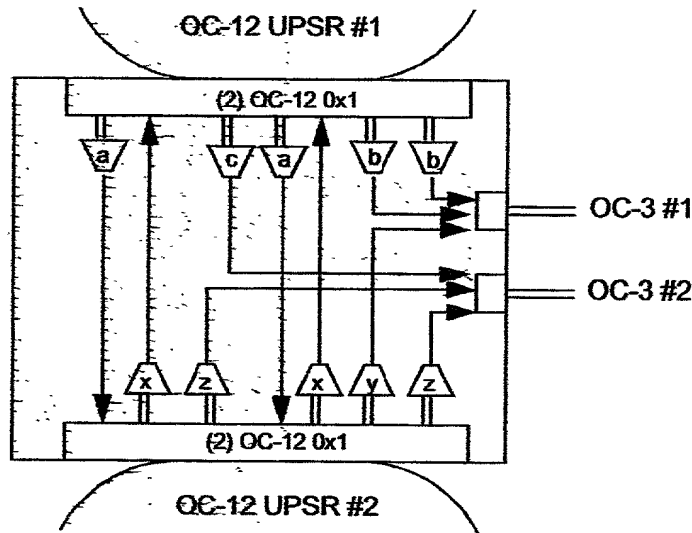
The examples for a UPSR application are based on the application in figure 7.2. Traffic is interconnected between two UPSRs, and other traffic is dropped from each UPSR to other ports.

a. Typically, the same name would be assigned for all groups dropping traffic from a given UPSR:

- groups labelled a, b, c: UPSR#1
- groups labelled x, y, z: UPSR#2

b. Sometimes, the user may want to separately operate a subset of groups from a UPSR, depending on the destination:

- groups labelled a: UPSR#1toUPSR#2
- groups labelled b: UPSR#1toOC3#1
- groups labelled c: UPSR#1toOC3#2
- groups labelled x: UPSR#2toUPSR#1
- groups labelled y: UPSR#2toOC3#1
- groups labelled z: UPSR#2toOC3#2



## FIGURE 15

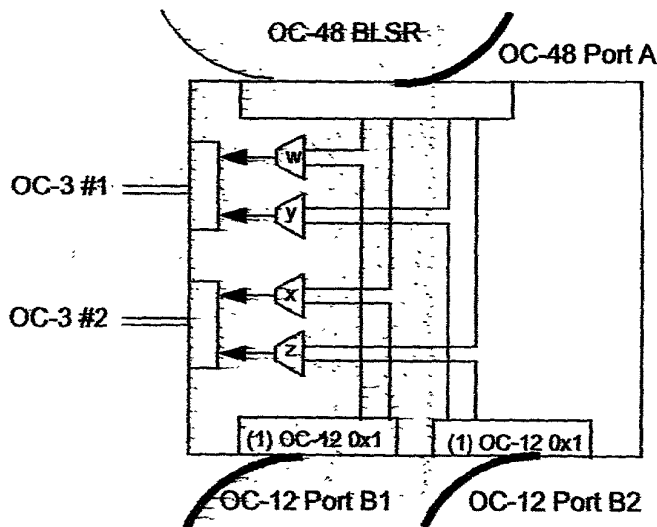
These examples for a Logical Rings application are based on the application in figure 3.3, on the right-hand side, but with two OC-12 rings instead of one. In these examples, STS-N path-protected traffic (in what would normally be two OC-12 UPSRs, B1 and B2) is transported through an OC-48 BLSR, and some of this traffic is dropped by the same network element which provides a BLSR node. In other words, traffic is dropped from Logical Rings consisting of tributaries on ports A and B1, or tributaries on ports A and B2.

a. Typically, the same name would be assigned for all groups dropping traffic from a given pair of ports:

- groups labelled w, x: LogicalRing#AB1
- groups labelled y, z: LogicalRing#AB2

b. Sometimes, the user may want to separately operate a subset of groups from a pair of ports, depending on the destination:

- groups labelled w: LogicalRing#AB1toOC3#1
- groups labelled x: LogicalRing#AB1toOC3#2
- groups labelled y: LogicalRing#AB2toOC3#1
- groups labelled z: LogicalRing#AB2toOC3#2



# FIGURE 16

This example is for Ring Interworking with the Drop-and-Continue method, for BLSR Primary Nodes in the Same NE. It is based on the application in figure 3.1-b, but with an OC-192 BLSR on the top and two OC-48 BLSRs instead of one on the bottom. In this example, some of the traffic is transported through each given pair of BLSRs and protected by ring interworking between that pair of BLSRs. This same NE serves as the primary node in both BLSRs for each of these circuits.

Typically, the same name would be assigned for all groups selecting traffic from a given pair of ports. For ring interworking with drop-and-continue in a BLSR (and primary nodes in the same NE), these groups are selecting either the "continue" traffic, drawn from the port receiving from the secondary node in the same ring, or the "inter-ring" traffic, drawn from the port receiving from the terminating node in one of the other rings. The names used in this example identify these two ports, in this order. Also in this example, the secondary nodes for these particular circuits in BLSRs 1, 2, and 3 are in the direction of ports A, C, and E, respectively, and the terminating nodes are in the direction of ports B, D, and F, respectively.

- groups labelled u: BLSR#1A-BLSR#2D
- groups labelled v: BLSR#1A-BLSR#3F
- groups labelled w: BLSR#2C-BLSR#1B
- groups labelled x: BLSR#2C-BLSR#3F
- groups labelled y: BLSR#3E-BLSR#1B
- groups labelled z: BLSR#3E-BLSR#2D

